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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/919,679 | 08/01/2001 | Juliana H.J. Brooks | BLP:101 (a) US-CIP | 6650 |

7590 01/03/2007

The Law Offices of Mark G. Mortenson
Post Office Box 310
North East, MD 21901-0310

| EXAMINER | |
|---|---|
| HANLEY, SUSAN MARIE | |
| ART UNIT | PAPER NUMBER |
| 1651 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 01/03/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/919,679 | BROOKS ET AL. | |
| | Examiner | Art Unit | |
| | Susan Hanley | 1651 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *31 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/31/06,5/8/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

The amendment and remarks filed 8/31/06 have been entered.

Claims 1-15 are pending.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### *Claim Rejections - 35 USC § 102*

Claims 1-4, 7-9 and 13 stand rejected under 35 U.S.C. 102(b) as being clearly anticipated by Tsutsui et al. (US 4,287,036; "Tsutsui").

Applicant argues that Tsutsui does not anticipate all of the elements of the claims because the frequencies disclosed by the reference relate to a reactant and not a catalyst, as claimed. Applicant asserts that Tsutsui discloses the continuous regeneration of an "active reducing agent" which is sometimes referred to as a catalyst by Tsutsui. Applicant asserts that Tsutsui teaches traditional photochemistry and cites other work by Tsutsui and Schrauzer to allegedly demonstrate that the transition metal (V) reacts with an alcohol to form a transition state metal alcoholate that acts as a hydrogen ion donor by reducing molecular nitrogen to form ammonia. Applicant asserts that the role of the metal in this mechanism does not meet the definition of a catalyst which "...is a substance that alters the reaction rate of the chemical reaction without appearing in the end product..." as put forth in the specification.

Responding to Applicant's argument that the transition state metal complex is a reactant and not a catalyst because the vanadium complex is only a continuously generated "active reducing agent" or a hydrogen donor, Applicant has not explained why this label precludes said vanadium complex as a catalyst. Moreover, the donation of an atom(s), electron(s) or proton(s) by a catalyst and the regeneration of said catalyst is a common mechanism. Many catalysts donate a atom(s), electron(s) or proton(s) to a reactant and are then regenerated to return them to their original state. For example, Lehninger discusses the mechanism of action for chymotrypsin on a dipeptide in Figure 9-15 on page 231, wherein the proton

of Ser 195 is ultimately transferred to the amine group of product 2. The last step of the mechanism is "The acyl group is displaced from Ser 195 by $H_2O$, thus *regenerating the free enzyme.*" Therefore, enzymes which are universally acknowledged as catalysts, can serve as active donors of an atom(s), electron(s) or proton(s) and are continuously regenerated. Thus, Applicant's allegation that the description of the vanadium complex as an "active reducing agent" that is continuously regenerated fails to render said complex as a reactant and not a catalyst.

Responding to Applicant's argument that Tsutsui discloses "only traditional photochemistry," Applicant has not explained what constitutes traditional vs. non-traditional photochemistry. Applicant has not addressed the rejection. Applicant has not explained why the alleged traditional photochemistry practiced by Tsutsui, which meets the steps of the claims, fails to anticipate the claims. Regarding Applicant's citation of other work by Tsutsui and Schrauzer, Applicant has failed to point out specifically what parts of these references support Applicant's argument. Applicant has made a generalized statement without supporting said statement with facts from either reference.

Responding to Applicant's argument that the role of the metal in this mechanism does not meet the definition of a catalyst which "...is a substance that alters the reaction rate of the chemical reaction without appearing in the end product...", the conversion of molecular nitrogen to ammonia in the absence of a catalyst has a very high transition state energy. If it did not, there would be a lot more ammonia in the atmosphere. Thus, the fact that molecular nitrogen is converted to ammonia is evidence that the rate of reaction has been increased by the presence of the vanadium complex augmented by the radiation. Regarding Applicant's argument that the catalyst, or some part thereof, should not appear in the product, Applicant appears to take issue with the fact that the vanadium complex donates hydrogen ions and can not square this with the alleged definition of a catalyst *supra*. However, the vanadium complex is consistent with the definition of a catalyst wherein "A catalyst is a substance that increases the rate of a reaction without being consumed" (Brady, top of page 344). As previously noted by Applicant, the vanadium complex is regenerated and, therefore, not consumed. The increase of the rate of the reaction

by the catalyst is discussed *supra* in this paragraph. Applicant's definition of a catalyst is at odds with the accepted definition because some part of a catalyst can be incorporated into a product, as shown with the chymotrypsin example where the enzyme transferred a proton to one of the products. The references cited for this response are cited only in response to Applicant's arguments.

Claims 1-4, 9 and 13 stand rejected under 35 U.S.C. 102(e) as being clearly anticipated by Mohr (US 6,217,712).

Applicant argues that Mohr does not place his invention in the possession of the public because he fails to recognize the critical components that NMR frequency is a function of magnetic field strength. Applicant provides a variety of field strengths and the associated frequencies for the $^{195}Pt$ isotope. Applicant asserts that it is unknown why the frequency of 9.29 MHz was chosen by Mohr.

Responding to Applicant argument that Mohr's invention is not in the public possession because he does teach the magnetic field strength and the choice of 9.29 MHz is of unknown origin, although Mohr does not teach the magnetic field strength, it is obvious that the value of 9.29 MHz is within the range of frequency values provided by Applicant, 0.2146202 MHz to 178 MHz. The ordinary artisan would have known that the NMR frequency for an element such as $^{195}Pt$ depends upon the magnetic field strength, as shown in the table on page 4 of Applicant's response. Furthermore, Mohr provides extensive guidance for the selection of the radiofrequency for the catalyst-free reaction, as shown in (col. 3, lines 40-62).

***Claim Rejections - 35 USC § 103***

Claims 1-4, 7-13 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lichtin et al. (US 4,861,484) in view of Tsutsui et al. (US 4,287,036; "Tsutsui").

Applicant argues that Lichtin is "most likely 'typical' photochemistry radiation used in the art."

Applicant argues that Tsutsui uses traditional photochemistry to regenerate a reactant and that Tsutsui does not overcome the deficiencies of Lichtin. Applicant alleges hindsight reasoning.

Responding to Applicant's argument that Tsutsui employs traditional photochemistry, Applicant has not explained what constitutes traditional vs. non-traditional photochemistry. Tsutsui is relevant to Lichtin because Tsutsui teaches a catalyst (see response *supra*) and the method of determining the optimum wavelength(s) or frequency(ies) that comprise the spectral pattern that is duplicated to augment the catalyst. In response to Applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Claims 1, 3, 4, 7, 8 and 10-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt, Jr. (US 4,115,280; "Pratt") in view of Vladimirov (1988, abstract only) and Cronheim (1937; abstract only).

Applicant asserts that the Examiner has used hindsight reasoning to combine the references based on Applicant's teachings. Applicant argues that Pratt focuses on the vibrational and rotational frequencies of various species that are not associated with visible light. Applicant argues that Cronheim focuses on visible light and discloses process that are "likely traditional photochemistry." Applicant asserts that Vladimirov utilizes visible light and ESR spectroscopy and that Vladimirov uses absorbance spectroscopy as a tool to determine structure and not for changes is activity.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only

knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). All of the references are directed to using a portion of the EM spectrum to effect a change in an enzyme or macromolecule. Clearly, Pratt teaches that the frequency and the amplitude of the *laser output radiation is controlled to* ***selectively affect the*** *macromolecular catalyst* (col. 10, lines 20-35). Pratt did not specifically teach that a spectrum of the enzyme was obtained to determine the optimum wavelength(s) or frequency(ies) that comprise the spectral pattern that is duplicated to augment the catalyst. However, by simple deduction, the frequency to control the laser output to selectively affect the catalyst must come from something provides such information. The supporting references show that it was known in the art that changes in absorption frequencies with the activity and structure of the enzyme are determined by spectral patterns of enzymes. Therefore, all of the references are related to influencing the activity/structure of a macromolecule by using a specific frequency of EM radiation to effect the desired change. Vladimirov and Cronheim demonstrate specifically how one determines the specific frequency from the spectral pattern of the macromolecule. The ordinary artisan would have known that this method could be used for any wavelength of light depending on the desired effect. Therefore, the reasoning to combine there references is not from hindsight.

Responding to Applicant's argument that Cronheim discloses process that are "likely traditional photochemistry," Applicant has not explained what constitutes traditional vs. non-traditional photochemistry.

No claim is allowed.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan Hanley whose telephone number is 571-272-2508. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SANDRA E. SAUCIER
PRIMARY EXAMINER

Susan Hanley
Patent Examiner
AU 1651